PCI2321

User’s Manual

Beijing ART Technology Development Co., Ltd.

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Chapter 1 Overview

The PCI2321 is a 24/48-bit parallel digital input/output (DIO) card designed for industrial applications. The plug and play feature of PCI-bus architecture make it easy for users to install their systems quickly.

The PCI2321 emulates two 8255 Programmable Peripheral Interface (PPI) chips. Each PPI offers 3 8-bit DIO ports which can be accessed simultaneously. The total 6 ports can be programmed as input or output independently.

PCI2321 mainly used for industrial control and related fields:

- ◆ Programmable digital input/output
- ◆ Industrial Monitoring
- ◆ LED display driver
- ◆ parallel data transmission
- ◆ TTL, DTL, CMOS logic circuits

Unpacking Checklist

Check the shipping carton for any damage. If the shipping carton and contents are damaged, notify the local dealer or sales for a replacement. Retain the shipping carton and packing material for inspection by the dealer.
Check for the following items in the package. If there are any missing items, contact your local dealer or sales.

- PCI2321 Data Acquisition Board
- ART Disk
  a) user's manual (pdf)
  b) drive
  c) catalog
- Warranty Card

FEATURES

Digital Input/Output

- Input/Output Type: TTL digital input / output
- Input Level: High-level: 2 ~ 5.25V
  Low-level: 0 ~ 0.8V
- Output Level: High-level: 2.4V minimum
  Low-level: 0.5V maximum
- Port Power-on Status: digital input
- Output Drive Capability: Source Current: 15mA
  Sink Current: 48mA
- Digital input signal can use external latch signal
- Data Transfer: program I/O
- Operating Temperature: 0℃~ +50℃
- Storage Temperature: - 20℃~ +70℃

- Relative Humidity: 5 ~ 95%, non-condensing

Interrupt Function

- COS interrupt
- Interrupt Source INT1: P1C0, P1C3, 32-bit event counter

  INT1 Interrupt Mode: P1C0 falling edge
  P1C0 and P1C3
  External interrupt counter
- Interrupt Source INT2: P2C0, P2C3, 32-bit timer (based on the 2MHz internal clock frequency)

  INT1 Interrupt Mode: P2C0 falling edge
  P2C0 and P2C3
  Internal interrupt counter

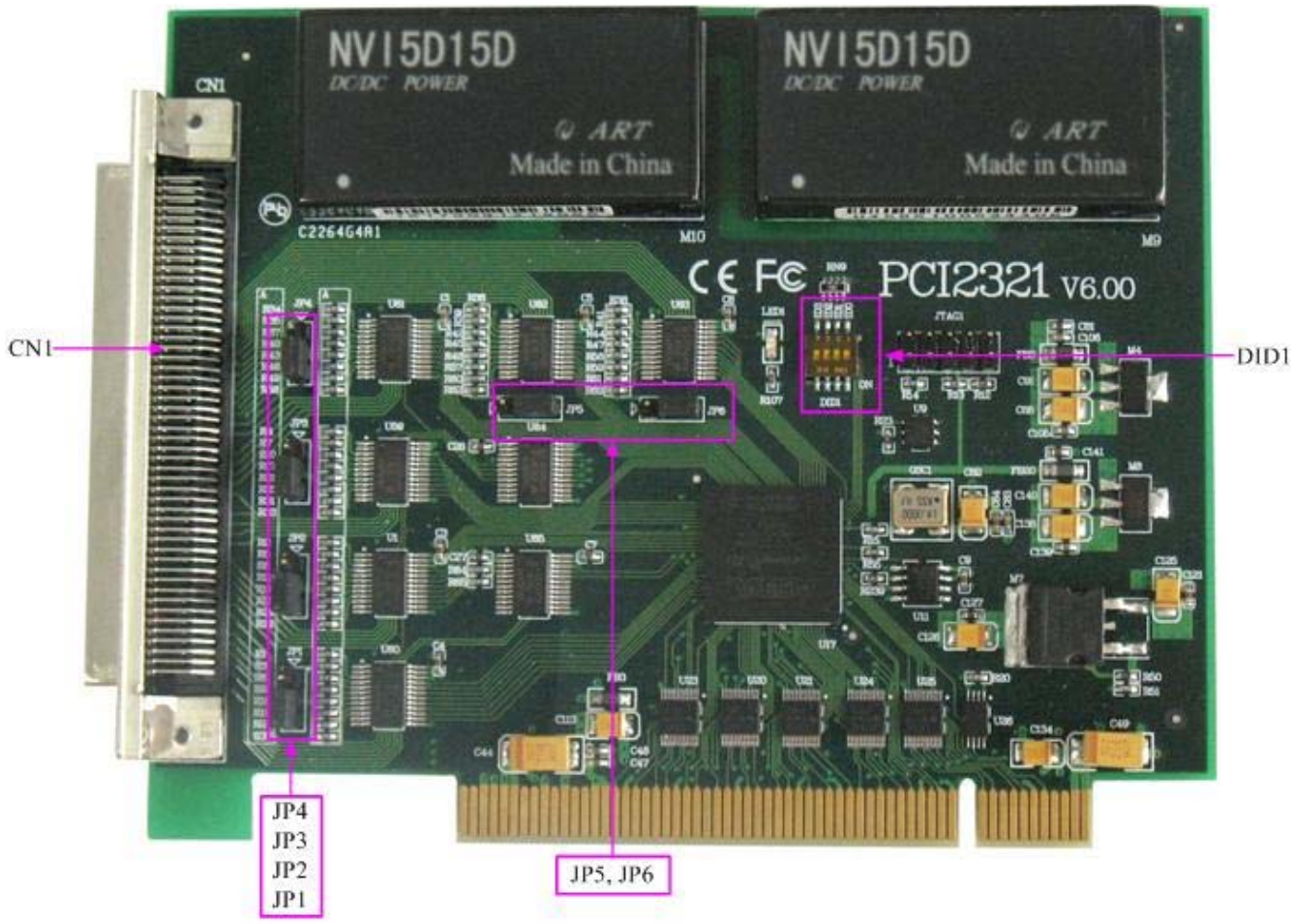
Timer/Counter Function

- A programmable 32-bit event counter to generate event interrupt (EVENT)
- A programmable 32-bit timer to generate timer interrupt (internal timer)

Board Dimension: 134mm (L)*106mm (W)

Chapter 2 Components Layout Diagram and a Brief Description

2.1 The Main Component Layout Diagram



2.2 Interface Description

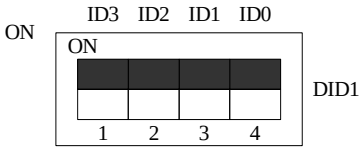
Please refer to the first section of the main component layout diagram, to understand the general function of the following main components.

2.2.1 Signal Connector

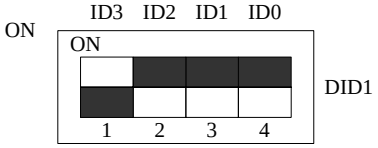
CN1: signal input and output connector

2.2.2 Physical ID of DIP Switch

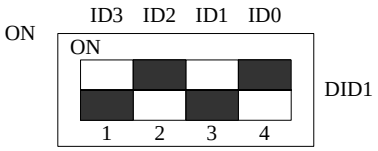
DID1: Set physical ID number. When the PC is installed more than one PCI2321 , you can use the DIP switch to set a physical ID number for each board, which makes it very convenient for users to distinguish and visit each board in the progress of the hardware configuration and software programming. The following four-place numbers are expressed by the binary system: When DIP switch points to "ON", that means "1", and when it points to the other side, that means "0." As they are shown in the following diagrams: place "ID3" is the high bit."ID0" is the low bit, and the black part in the diagram represents the location of the switch. (Test software of the company often use the logic ID management equipments and at this moment the physical ID DIP switch is invalid. If you want to use more than one kind of the equipments in one and the same system at the same time, please use the physical ID as much as possible.).



The above chart shows"1111", so it means that the physical ID is 15.



The above chart shows"0111", so it means that the physical ID is 7.



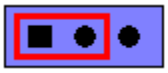
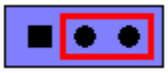
The above chart shows"0101", so it means that the physical ID is 5.

ID3	ID2	ID1	ID0	Physical ID（Hex）	Physical ID（Dec）
OFF（0）	OFF（0）	OFF（0）	OFF（0）	0	0
OFF（0）	OFF（0）	OFF（0）	ON（1）	1	1
OFF（0）	OFF（0）	ON（1）	OFF（0）	2	2
OFF（0）	OFF（0）	ON（1）	ON（1）	3	3
OFF（0）	ON（1）	OFF（0）	OFF（0）	4	4
OFF（0）	ON（1）	OFF（0）	ON（1）	5	5
OFF（0）	ON（1）	ON（1）	OFF（0）	6	6
OFF（0）	ON（1）	ON（1）	ON（1）	7	7
ON（1）	OFF（0）	OFF（0）	OFF（0）	8	8
ON（1）	OFF（0）	OFF（0）	ON（1）	9	9
ON（1）	OFF（0）	ON（1）	OFF（0）	A	10
ON（1）	OFF（0）	ON（1）	ON（1）	B	11
ON（1）	ON（1）	OFF（0）	OFF（0）	C	12
ON（1）	ON（1）	OFF（0）	ON（1）	D	13
ON（1）	ON（1）	ON（1）	OFF（0）	E	14
ON（1）	ON（1）	ON（1）	ON（1）	F	15

2.2.3 Jumper

JP1~ JP6: the power-on status selection of the P1A ~ P2C, can be set to pull-up, drop-down or Null.

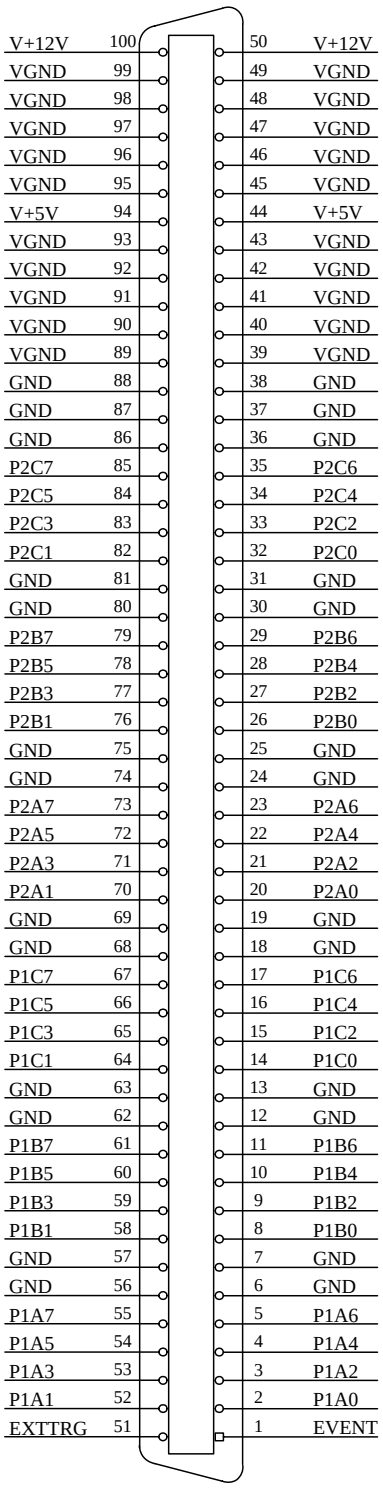
Jumpers for each port can be controlled independently, the default status is drop-down, the specific setting, please refer to the following table:

Power-on Status Selection	**JP1(P1A) JP2(P1B) JP3(P1C) JP4(P2A) JP5(P2B) JP6(P2C)**
Pull-up	
Drop-down	
Null	

Chapter 3 Signal Connectors

3.1 The Definition of DI/DO Connectors

CN1: 100- pin SCSI definition

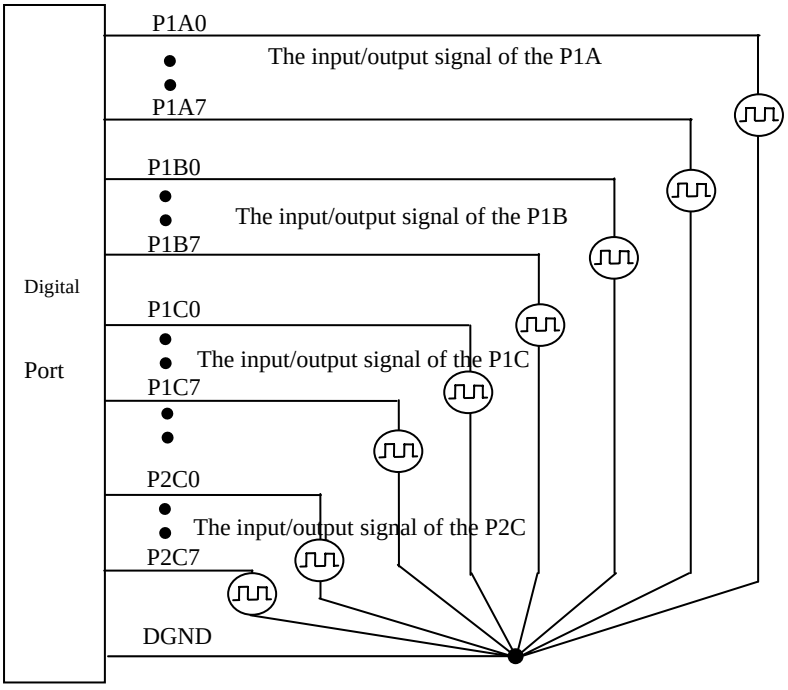


Pin definition

Signal Name	Type	Definition
P1A0～P1A7	Input/Output	8 digital inputs/outputs of the P1A port.
P1B0～P1B7	Input/Output	8 digital inputs/outputs of the P1B port.
P1C0～P1C7	Input/Output	8 digital inputs/outputs of the P1C port.
P2A0～P2A7	Input/Output	8 digital inputs/outputs of the P2A port.
P2B0～P2B7	Input/Output	8 digital inputs/outputs of the P2B port.
P2C0～P2C7	Input/Output	8 digital inputs/outputs of the P2C port.
EVENT	Input	The clock of external counter input port.
EXTTRG	Input	The external trigger signal input port.
GND	GND	Digital ground.
VGND	GND	Power ground.
V+5V	PWR	+5V power output
V+12V	PWR	+12V power output

3.2 Digital Signal Connection

6 ports can be independently configured as input or output port.



Chapter 4 Operation Principle

4.1 Digital Port

The PCI2321 emulates two 8255 Programmable Peripheral Interface (PPI) chips. Each PPI offers 3 8-bit DIO ports (A, B. C) which can be accessed simultaneously. The total 6 ports can be programmed as input or output independently.

4.1.1 Configure the Port to Digital Input

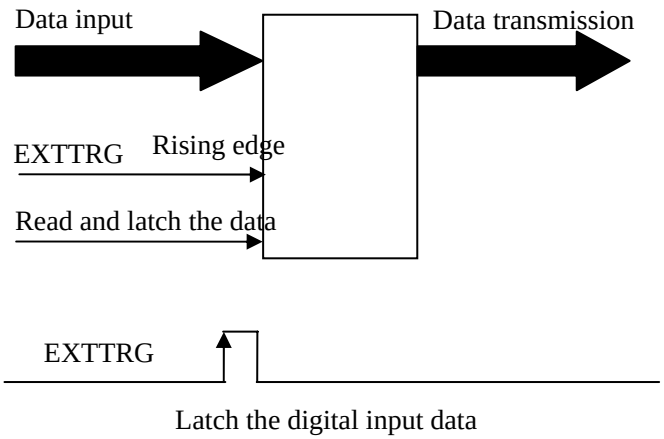
When the 51-pin (EXTTRG) of CN1is used for external trigger input, the rising edge is active, the user can receive the external trigger signal to latch input data.

When select the port as input, and click the "P1/P2 enable the external trigger function" box, the A, B, C port of the P1, P2, will read the input status and latch in the rising edge of the EXTTRG signal, and it will read again until the next rising edge of the EXTTRG signal.

If do not select the "P1/P2 enable the external trigger function", then the port is used as the general IO port, the change of the EXTTRG signal input state does not affect the reading of the input status, the change of the port input status o according to the external signal .

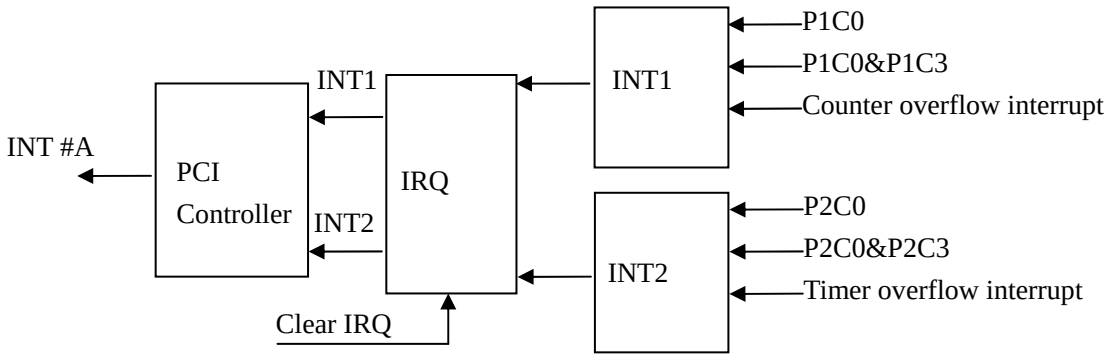
4.1.2 Configure the Port to Digital Output

When select the port as output, the channels of the each port can be set to On or Off by the software, the corresponding output state will also change, can use multimeter to measure the output level.



4.2 Interrupt

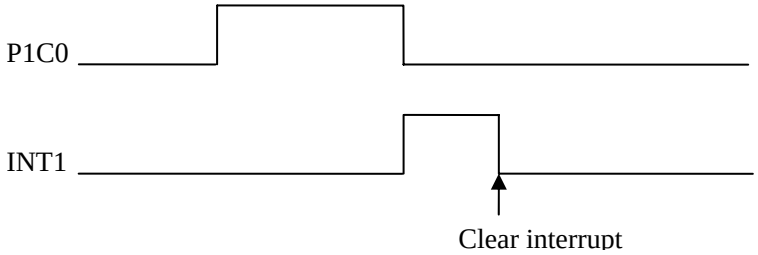
There are two sources of interrupt signals: INT1and INT2, the interrupt signal can be generated by digital input signal, timer/event counter overflow signal, and we can select the interrupt source by the software.



4.2.1 INT1 Interrupt

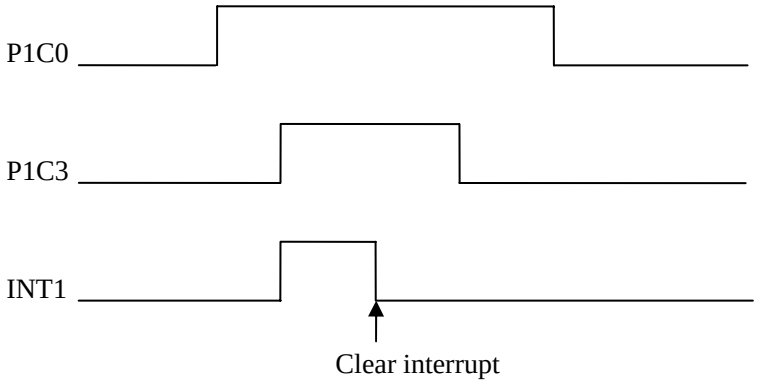
(1) P1C0 falling edge interrupt

When there is falling edge signal of the P1C0, it generates an interrupt signal.



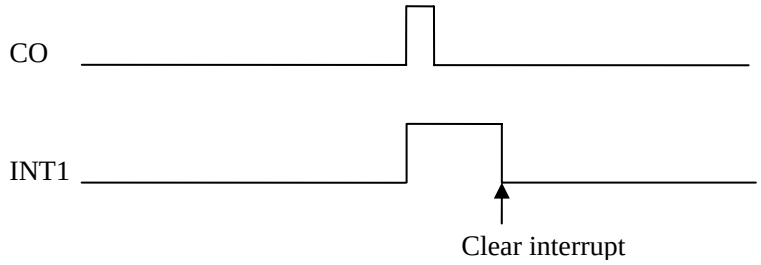
(2) P1C0 and P1C3 interrupt

When the signal of the P1C0 is high-level, if the P1C3 port has rising edge, then it will generate interrupt signal.



(3) External counter interrupt

The 1-pin (EVENT) of CN1 is the external counter clock input, after set the initial value, it starts to count, under the rising edge of the EVENT signal, it does the reducing the count, when the value reaches 0, the counter overflows, generates a pulse signal CO, and generates an interrupt signal.



4.2.2 INT2 Interrupt

(1) P2C0 falling edge interrupt
When there is falling edge signal of the P2C0, it generates an interrupt signal.

(2) P2C0 and P2C3 interrupt
When the signal of the P2C0 is high-level, if the P2C3 port has rising edge, then it will generate interrupt signal.

(3) Internal timer interrupt
Internal counter mode, the counter clock is 2M, after set the initial value, it starts to count, under the internal timing signal, it does the reducing the count, when the value reaches 0, the counter overflows, generates a pulse signal CO, and generates an interrupt signal. Counter automatically reload the initial value to start counting.

4.3 Counter/Timer

PCI2321 supports a programmable 32-bit event counter to generate event interrupt (EVENT) and a programmable 32-bit timer to generate timer interrupt (internal timer)

The EVENT pin of the CN1is used for the external counter clock input port, allows the counter does reducing count under the clock signal input from the EVENT pin, generate the interrupt if it counts to 0.

In internal counter mode, the counter clock is 2M, it allows the counter under the internal clock to count, generate the interrupt if it counts to 0, and the counter automatically reload the initial value to start the counting.

4.4 Power

PCI2321 provides +12V and +5V power supply for external devices. To avoid short circuit or overload of the power supply, the resettable fuses are added on all the power supply signals.

The maximum current for 5V power supply is 0.5A, if the load current is larger than this limitation, the resistance of the resettable fuse will increase for the reason of the rising temperature. The rising resistance will further cause the power supply to reduce the load current. After the condition of overload or short circuit is removed, the fuse will return to its normal condition. It is unnecessary to replace the fuse.

The maximum current of 12V power supply is 0.5A, too. The action of the fuse is the same as that of +5V power supply.

Chapter 5 Notes and Warranty Policy

5.1 Notes

In our products' packing, user can find a user manual, a PCI2321 module and a quality guarantee card. Users must keep quality guarantee card carefully, if the products have some problems and need repairing, please send products together with quality guarantee card to ART, we will provide good after-sale service and solve the problem as quickly as we can.

When using PCI2321, in order to prevent the IC (chip) from electrostatic harm, please do not touch IC (chip) in the front panel of PCI2321 module.

5.2 Warranty Policy

Thank you for choosing ART. To understand your rights and enjoy all the after-sales services we offer, please read the following carefully.

1. Before using ART's products please read the user manual and follow the instructions exactly. When sending in damaged products for repair, please attach an RMA application form which can be downloaded from: www.art-control.com.

2. All ART products come with a limited two-year warranty:

- The warranty period starts on the day the product is shipped from ART's factory
- For products containing storage devices (hard drives, flash cards, etc.), please back up your data before sending them for repair. ART is not responsible for any loss of data.
- Please ensure the use of properly licensed software with our systems. ART does not condone the use of pirated software and will not service systems using such software. ART will not be held legally responsible for products shipped with unlicensed software installed by the user.

3. Our repair service is not covered by ART's guarantee in the following situations:

- Damage caused by not following instructions in the User's Manual.
- Damage caused by carelessness on the user's part during product transportation.
- Damage caused by unsuitable storage environments (i.e. high temperatures, high humidity, or volatile chemicals).
- Damage from improper repair by unauthorized ART technicians.
- Products with altered and/or damaged serial numbers are not entitled to our service.

4. Customers are responsible for shipping costs to transport damaged products to our company or sales office.

5. To ensure the speed and quality of product repair, please download an RMA application form from our company website.

Products Rapid Installation and Self-check

Rapid Installation

Product-driven procedure is the operating system adaptive installation mode. After inserting the disc, you can select the appropriate board type on the pop-up interface, click the button【driver installation】; or select CD-ROM drive in Resource Explorer, locate the product catalog and enter into the APP folder, and implement Setup.exe file. After the installation, pop-up CD-ROM, shut off your computer, insert the PCI card. If it is a USB product, it can be directly inserted into the device. When the system prompts that it finds a new hardware, you do not specify a drive path, the operating system can automatically look up it from the system directory, and then you can complete the installation.

Self-check

At this moment, there should be installation information of the installed device in the Device Manager (when the device does not work, you can check this item.). Open "Start -> Programs -> ART Demonstration Monitoring and Control System -> Corresponding Board -> Advanced Testing Presentation System", the program is a standard testing procedure. Based on the specification of Pin definition, connect the signal acquisition data and test whether AD is normal or not. Connect the input pins to the corresponding output pins and use the testing procedure to test whether the switch is normal or not.

Delete Wrong Installation

When you select the wrong drive, or viruses lead to driver error, you can carry out the following operations: In Resource Explorer, open CD-ROM drive, run Others-> SUPPORT-> PCI.bat procedures, and delete the hardware information that relevant to our boards, and then carry out the process of section I all over again, we can complete the new installation.